Patent
Attorney's Docket No. 013550-069

Req for Record
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6/11/02
BROSS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	
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Bruce R. SMITH et al.	)	Group Art Unit: 3721
	)	
Application No.: 09/453,498	)	Examiner: E. Kim
	)	
Filed: December 3, 1999	)	
	)	
For: FOOD SERVING PAPERBOARD CONTAINER PRESSING APPARATUS EMPLOYING CAST-IN ELECTRICAL HEATERS	)	

REQUEST FOR RECONSIDERATION

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Official Action dated December 3, 2001, favorable reconsideration of this application is respectfully requested in view of the following remarks.

At the outset, the undersigned and Mr. Littlejohn express appreciation to Examiner Kim for his time and attention during the interview that was conducted at the U.S. Patent and Trademark Office on May 22, 2002. The remarks below discuss the substance of the interview.

Examiner Kim is also thanked for the indication that Claim 22 would be allowable if amended to include the subject matter of independent Claim 19.

The only issue raised in the Official Action involves the rejection of Claims 1-21 on the basis of the disclosure contained in U.S. Patent No. 4,721,500 to *Van Handel et al.* in

view of the disclosure contained in U.S. Patent No. 6,180,926 to *Duddy et al.* This rejection is respectfully traversed for at least the reasons discussed during the interview and set forth below.

As discussed during the interview, prior to development of the claimed invention at issue here, pressing apparatus used in applicant's facilities for producing food service paperboard containers employed electrically resistive ring heaters to heat the upper and lower dies of the pressing apparatus. Mr. Littlejohn explained some of the difficulties associated with these ring heaters. For example, the production of food service paperboard containers typically requires relatively high temperatures which typically means that the ring heaters must possess a very high wattage. In operation, the ring heaters are oftentimes run at a wattage on the order of 1500 watts - 5000 watts, a level greatly exceeding the power wattage ratings of the ring heaters. As explained by Mr. Littlejohn, the typical warranted wattage rating for these ring heaters is on the order of 550 watts - 1250 watts. As a result, the ring heaters purchased by applicant for use in pressing apparatus that produce food service paperboard containers are purchased as special order ring heaters and are not covered under warranty. As applicant discovered, operating the ring heaters at the levels required for producing food service paperboard containers significantly reduces the life of the ring heaters, thus necessitating frequent replacement of the ring heaters.

Another problem associated with the use of ring heaters relates to their construction. As explained during the interview, by virtue of their construction, ring heaters are susceptible to the ingress of water. This infiltrated water is transformed into

steam pressure during operation which can distort the sheath of the ring heater so that the sheath takes on a warped or curved configuration. This results in a rather substantial loss of contact area with the die, thus reducing heat transfer to the die and causing inadequate and non-uniform heating. In addition, this distortion of the ring heater can place further strain on the operational rating of the ring heater. That is, when the ring heater distorts, heat is not effectively transferred to the die and so the thermocouple probes which measure the temperature near the surfaces of the dies determine that the die heating surfaces are not sufficiently hot. This causes the ring heaters to be run at full wattage and higher temperatures for longer periods of time, and creates further operational problems that significantly reduce the operating life of the ring heaters.

Mr. Littlejohn also explained during the interview that when a ring heater fails, the cost associated with replacing the ring heater constitutes only a part of the problem. A more significant concern involves the pressing apparatus down time and associated lost production. As pointed out by way of example during the interview, pressing apparatus employed in applicant's facility in Bowling Green, Kentucky are constructed with five die sets per pressing apparatus. Thus, each stroke of the pressing apparatus produces five food service paperboard containers. When a heater fails in one of the die sets, the entire pressing apparatus must be stopped to permit replacement of the failed heater. Thus, production is lost not only with respect to the die set containing the failed heater, but also with respect to the other four die sets in the pressing apparatus. Considering that the pressing apparatus may be shut down for up to an hour (to permit sufficient cooling of the

die and then replacement of the failed heater), the lost production is significant. This loss becomes even more significant when considered in the context of many pressing apparatus operating throughout several facilities.

By using a cast-in heater(s) rather than ring heaters, the claimed pressing apparatus at issue here addresses difficulties and disadvantages associated with the use of ring heaters in pressing apparatus that produce food service paperboard containers. As explained during the interview, a cast-in heater does not have to be operated at the same high wattage as the ring heaters, and can in fact be operated at significantly lower wattage while still achieving the necessary temperature at the die surface. In contrast to ring heaters previously used, a cast-in heater can thus be purchased with a wattage rating within recommended guidelines. The cast-in heater is thus not only covered under warranty, but more importantly experiences a significantly longer heater life. A cast-in heater also has a substantially lower heater surface temperatures during heat up and production than in the case of ring heaters. Additionally, the construction of a cast-in heater is not nearly as susceptible to the ingress of water and so the distortion problems associated with ring heaters is not likely to occur. The cast-in heater thus maintains a flatter surface to provide more uniform heating as well as better heat transfer. Also, electrical cost savings can be realized with a cast-in heater because of its lower wattage and more efficient thermal transfer to the die set.

As discussed during the interview, the disclosure in *Duddy et al.* would not have motivated one to replace the electrical resistance heaters mentioned in *Van Handel et al.* with cast-in heaters. The reasons are several.

First, *Van Handel et al.* does not recognize the difficulties associated with the use of electrical resistance heaters. Consequently, an individual considering the disclosure contained in *Van Handel et al.* would have found no reason to employ a different type of heater, let alone a cast-in heater as claimed.

In addition, the disclosure in *Duddy et al.* is specifically directed to a heater device for a semiconductor wafer support. The disclosed device is used in the manufacture of semiconductor devices utilizing processes that require the semiconductor wafers to be maintained at a stable temperature. The disclosure in *Duddy et al.* is not at all concerned with a paperboard pressing apparatus that utilizes upper and lower dies for forming a food service paperboard container. Thus, even if motivation could be established for using an alternative to the heater described in *Van Handel et al.*, one would not have found the disclosure contained in *Duddy et al.* to be particularly relevant with respect to providing guidance on alternative heaters to be used in a paperboard pressing apparatus.

Further, the Official Action states that the disclosure in column 3, line 20+ of *Duddy et al.* "teaches" using cast-in heaters. However, as pointed out during the interview, this portion of the disclosure in *Duddy et al.* does not mention cast-in heaters. Rather, *Duddy et al.* here describes that the heat exchange element 20 for controlling the platen temperature may be a resistive heater (a coil of resistive material that heats when

current flows through it), a fluidic heater (i.e., a tube through which heated fluid flows) or a fluidic cooler (i.e., a tube through which a coolant flows). Thus, it cannot be said that this disclosure in *Duddy et al.* "teaches" replacing the heater described in *Van Handel et al.* with a cast-in heater.

The undersigned pointed out during the interview that the background portion of *Duddy et al.* refers to a cast-in heater. The discussion in column 1 of *Duddy et al.* mentions that heater assemblies forming a portion of a semiconductor wafer support typically include a platen fabricated of thermally conducted material and having a top surface shaped to support a semiconductor wafer within a process chamber. A heating element is mounted in or under the platen in thermally conductive contact with the platen surface so that the semiconductor wafer supported by the platen can be heated during processing. The discussion beginning in line 33 of column 1 of *Duddy et al.* mentions that one manufacturing technique for producing a heater assembly used in connection with a semiconductor wafer support involves a cast-in method in which a heating element is cast-into the platen during formation of the platen. *Duddy et al.* goes on to note that this cast-in method involves inserting a resistive heating element into molten material during manufacture of the platen. As stated by *Duddy et al.*, this requires the use of a heating element having a melting point substantially higher than the melting point of the platen material. *Duddy et al.* thus observes that when stainless steel or aluminum material is used for the heating element, the types of material that can be used to fabricate the platen are quite limited. After recognizing this drawback associated with heating elements that are

cast-into the platen, *Duddy et al.* discusses near the bottom of column 1 the need for an improved temperature control apparatus that is not limited with respect to the materials used for fabricating the platen and the heat exchange element. Thus, *Duddy et al.* specifically seeks to avoid using a heating element that is cast-into the platen. It thus can hardly be said that *Duddy et al.* "teaches" the use of a cast-in heater as an alternative to the heater described in *Van Handel et al.* Indeed, the discussion in *Duddy et al.* regarding a heating element that is cast-into a platen would have actually directed one away from using such a construction.

For at least the reasons discussed above, the claimed invention at issue here is patentably distinguishable over a hypothetical combination of the disclosures contained in *Van Handel et al.* and *Duddy et al.*

Further evidence supporting the patentability of the claimed invention at issue here is provided by the unexpected results that have been achieved through use of the claimed invention. Using cast-in heaters in various facilities, the applicant has seen a dramatic reduction in the number of heater failures as compared to when ring heaters were employed. This is established by the accompanying Declaration Under 37 C.F.R. § 1.132 of Mr. Dana Markwell. As discussed in the Declaration, the applicant's facility in Bowling Green, Kentucky employed four pressing apparatus to produce nine-inch paper plates. Each pressing apparatus included five die sets, with each die set employing three ring heaters. Thus, the four pressing apparatus included a total of 60 ring heaters. As further set forth in the Declaration, between January 1, 1997 and December 31, 1997, the

four pressing machines experienced a total of 345 ring heater failures requiring replacement of the ring heater.

This is in stark contrast to what applicant has experienced through use of cast-in heaters. The Declaration points out that the ring heaters used in the four pressing machines mentioned above have been replaced with cast-in heaters. By using cast-in heaters, only two cast-in heaters are required for each die set (i.e., one in the upper die and one in the lower die). Also, the facility in Bowling Green, Kentucky has added six additional pressing machines for producing nine-inch paper plates. Each of these six additional pressing machines also has five die sets, with each die set being heated by two cast-in heaters. There are thus ten pressing machines currently operating at the Bowling Green facility for manufacturing nine-inch plates, with a total of 100 cast-in heaters being used in the ten pressing machines. The Declaration notes that between March 1, 2001 and February 28, 2002, the ten pressing machines have experienced only 7 cast-in heater failures requiring replacement of the cast-in heater.

These results are quite significant and unexpected. Indeed, heater failures have been virtually eliminated -- decreasing from 345 ring heater failures over a one-year period for four pressing machines operating a total of 60 ring heaters to 7 cast-in heater failures over a one-year period for ten pressing machines operating a total of 100 cast-in heaters.

Of course, these results are even more striking when it is considered that the 7 cast-in heater failures occurred in the context of a larger number of machines (10 versus 4) and a larger number of total heaters (100 versus 60). For example, the 345 ring heater

failures occurring over a one-year period for pressing machines operating a total of 60 ring heaters can be extrapolated to 575 expected ring heater failures over a one-year period for pressing machines operating a total of 100 ring heaters. Alternatively, the 345 ring heater failures over a one-year period for four pressing machines can be extrapolated to 862 expected ring heater failures over a one-year period for ten pressing machines.

The Federal Circuit has repeatedly held that objective evidence such as unexpected results must be considered in the obviousness inquiry and indeed must be considered before reaching a conclusion on the obviousness determination. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 231 U.S.P.Q. 81, 91 (Fed. Cir. 1986). The unexpected results achieved through use of the claimed invention as discussed in the accompanying Declaration, considered together with the other deficiencies pointed out above, leads to the conclusion that a *prima facie* case of obviousness has not be established here and that the claimed invention is patentable. Accordingly, withdrawal of the rejection of record and allowance of this application are earnestly solicited.

Should any questions arise in connection with this application or should the Examiner believe that a telephone conference with the undersigned would be helpful in

resolving any remaining issues pertaining to this application, the undersigned respectfully requests that he be contacted at the number indicated below.

Respectfully submitted,

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By: _____

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